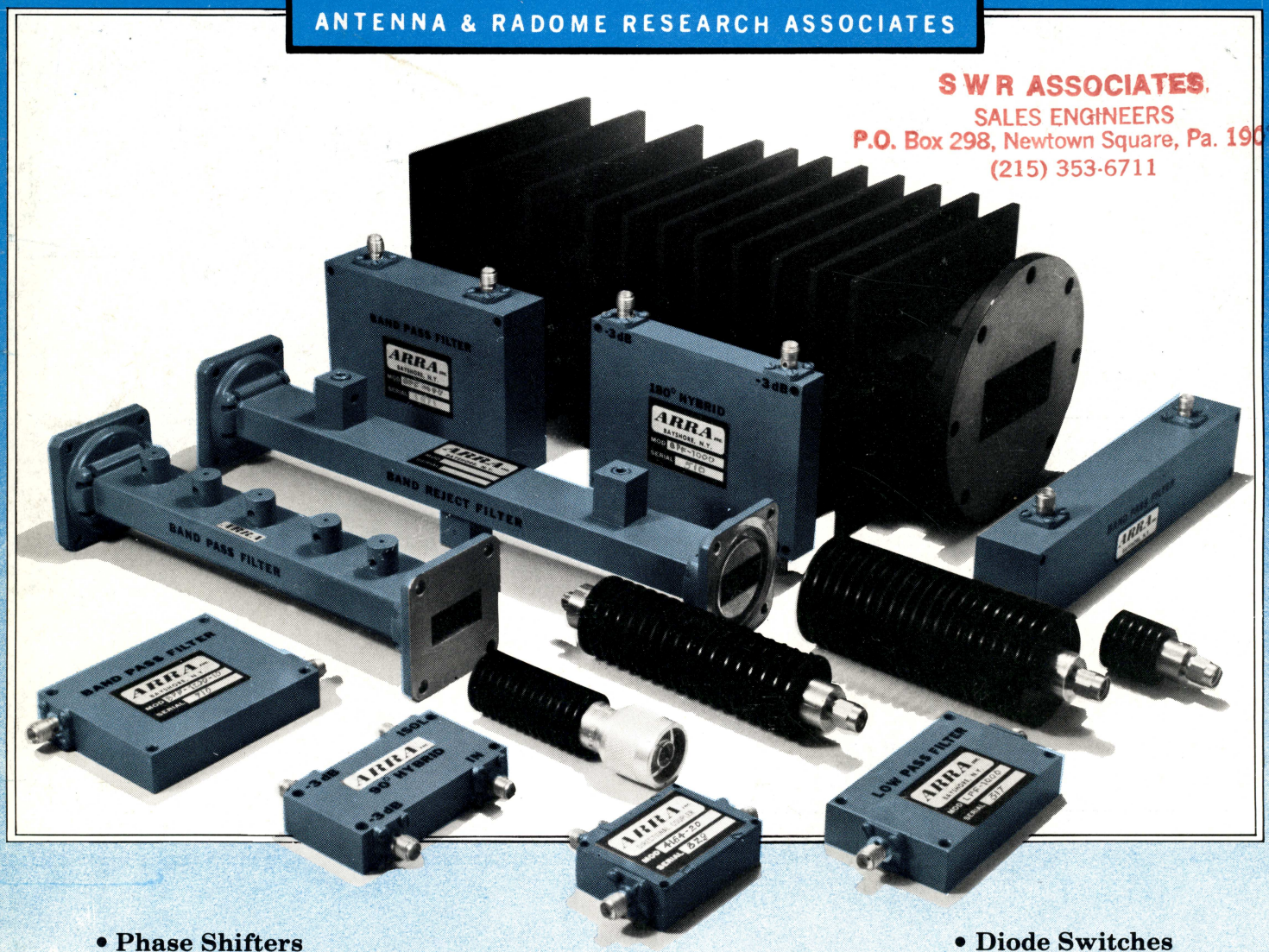
GILMORE

. . .the last word in variable attenuators

ARRA INC.

ANTENNA & RADOME RESEARCH ASSOCIATES

SWR ASSOCIATES
SALES ENGINEERS
P.O. Box 298, Newtown Square, Pa. 19073
(215) 353-6711



- Phase Shifters
- Power Dividers
- Diode Attenuators
- Variable Attenuators
- Coax & Waveguide Loads
- Diode Switches
- Fixed Attenuators
- Couplers & Hybrids
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ARRA INC.
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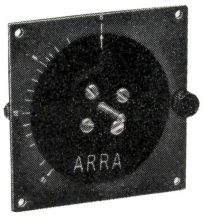
CONTINUOUSLY VARIABLE ATTENUATORS

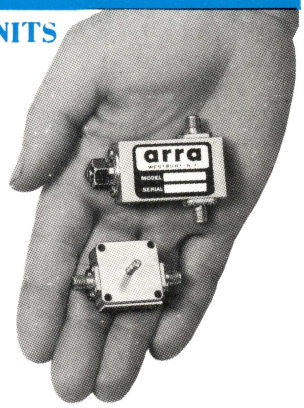
Miniature Models

LEVEL SET NON-TRANSLATING SHAFT & VAMP TYPE UNITS

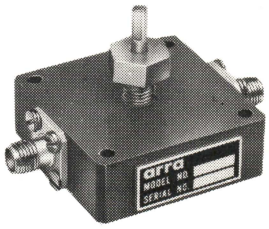


Form 3348
(2½" Sq. Plate on Form 3347)

Freq. Rge. (GHz)	Atten. Rge. (dB)	Max. VSWR	Max Ins. Loss (dB)	Form Factor	Model No.
1.0–12.4	10	1.5	0.5	4061	3–6844–10
1.0–2.0	10	1.8	0.5	3651	3814–10
1.0–2.0	15	1.5	0.5	4061	3844–15
1.5–2.0	15	1.7	0.5	3651	3814–15
2.0–12.4	20	1.5	0.5	4061	4–6844–20
2.0–4.0	10	1.8	0.5	2191	4804–10
	20	1.5	0.5	3651	4814–20
	30	1.5	0.5	4061	4844–30
2.5–4.0	10	1.5	0.5	2191	4804–10X
	10	1.5	0.5	2302	4604–10
3.0–5.0	10	1.5	0.5	3347	4–5604–10X
4.0–8.0	10	1.5	0.5	2191	5804–10
	20	1.5	0.5	2191	5804–20
	30	1.5	0.5	3651	5814–30
	10	1.5	0.5	3347	5604–10X
	20	1.5	0.5	3347	5604–20X
5.0–8.0	30	1.5	0.5	3347	5604–30Y
6.0–11.0	10	1.5	0.5	2191	5–6804–10
	20	1.5	0.5	2191	5–6804–20
	30	1.5	0.5	2191	5–6804–30
	40	1.5	0.5	3651	5–6814–40
8.0–12.4	10	1.5*	0.5	2191	6804–10
	20	1.5*	0.5	2191	6804–20
	30	1.5*	0.5	2191	6804–30
	40	1.5*	0.5	3651	6814–40
	10	1.5	0.5	3347	6604–10
	20	1.5	0.5	3347	6604–20
	30	1.5	0.5	3347	6604–30
8.0–18.0	10	1.5*	1.0	2191	9804–10
	20	1.5*	1.0	2191	9804–20
	30	1.5*	1.0	2191	9804–30
	40	1.5*	1.0	3651	9814–40
12.0–18.0	10	1.5	0.5	2191	9804–10X
	20	1.5	0.5	2191	9804–20X
	30	1.7	0.5	2191	9804–30X
	40	1.7	0.5	2191	9804–40X



Form 2405 (1¾" x 1" x ½")
Form 3987 (2" x 1¼" x ½")

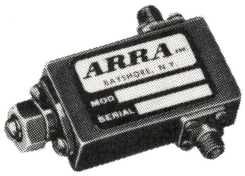


Form 2302—Conn. on ℄
Form 3347—Conn. off ℄
(1½" x 1½" x ½")

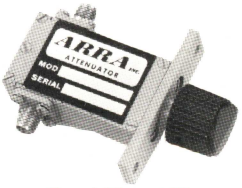
DIRECT READING & OTHER FREQ. INSENSITIVE UNITS

Freq. Rge. (GHz)	Atten. Rge. (dB)	Atten. vs Freq. (±dB)	Max. VSWR	Max Ins. Loss (dB)	Form Factor	Model No.
3.0–4.0	10	1.5	1.5	0.5	3347	4603–10
	10	1.5	1.5	0.5	3348	4603–10D
3.7–4.2	20	1.0	1.5	0.5	3651	4–5813–20
4.0–8.0	10	1.5	1.5	0.5	3347	5603–10
	10	1.5	1.5	0.5	3348	5603–10D
5.4–5.9	20	0.5	1.5	0.5	3651	5813–20A
5.9–6.5	20	0.5	1.5	0.5	3651	5813–20B
7.2–7.8	30	0.5	1.5	0.5	3651	5813–30A
7.2–8.4	30	1.0	1.5	0.5	3651	5–6813–30A
7.9–8.4	30	0.5	1.5	0.5	3651	6813–30A
8.0–12.4	10	1.0	1.5	0.5	3347	6603–10
	10	1.0	1.5	0.5	3348	6603–10D
8.0–18.0	10	1.5	1.5*	1.0	2191	9803–10
8.5–10.5	10	0.5	1.5	0.5	2191	6803–10A
	20	0.5	1.5	0.5	2191	6803–20A
10.5–12.4	10	0.5	1.6	0.5	2191	6803–10B
	20	0.5	1.6	0.5	2191	6803–20B
12.0–18.0	10	1.0	1.5	0.5	2191	9803–10A

* 1.7 VSWR above 11.0 GHz



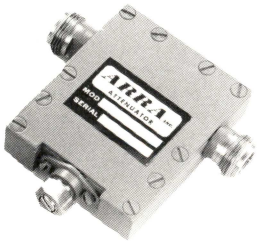
Form 2191 (1¾" x 1" x ½")
Form 3651 (2" x 1¼" x ½")



Panel Mount Types
Form 4321 (1¾" x 1" x ½")
Form 4322 (2" x 1¼" x ½")

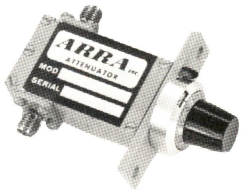
GENERAL SPECIFICATIONS

R.F. Power . . . . . 5 W Average, 3 KW Peak
Connectors . . . . . SMA Female Standard
(Type N available on Form 4061 at no additional cost)
Locking Device . . . . . All forms except micrometer and panel mount types
Weight . . . . . 2 oz. (Form 2191)
Mounting . . . . . All forms have tapped or thru holes



Form 4061 (2½" x 2" x 5/8")

Note: 1. Precede Form 2191, 3651 or 4061 Model No. with "P" to specify panel mounted version; with "T" to specify turns-counting version; with "M" to specify micrometer version.
2. Form 3348 is direct reading in 1dB attenuation increments.



Form 4319 (1¾" x 1" x ½")
Form 4320 (2" x 1¼" x ½")
(Furnished with turns-counting dial)

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ARRA INC.
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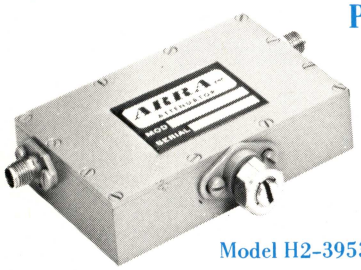
CONTINUOUSLY VARIABLE ATTENUATORS

Phaseless Types
DC Models
High Power

PHASELESS VARIABLE ATTENUATORS



Model H2-3953-3

GENERAL DESCRIPTION

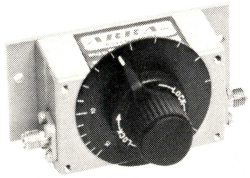
This new line of continuously variable attenuators utilizes a unique approach to vary amplitude with little if any change in phase. High power and an extremely flat attenuation vs frequency response is also achieved.

Phase data is presently being finalized and ARRA should be contacted for the latest information.

Freq. Rge. (MHz)	Dyn. Atten. Rge. (dB)	Power (Aver. W)	Atten. vs Freq. (dB)	Max. Ins. Loss (dB)	VSWR (Max.)	Model No.
350–500	3	5	±0.2	0.2	1.2	1953-3A
350–500	3	40	±0.2	0.2	1.2	H1953-3A
350–500	40	5	±0.25	3.25	1.3	1953-40A
350–500	40	25	±0.25	3.25	1.3	H1953-40A
960–1215	3	5	±0.2	0.2	1.2	2-3953-3
960–1215	3	40	±0.2	0.2	1.2	H2-3953-3
950–1215	40	5	±0.25	3.25	1.3	2-3953-40
960–1215	40	25	±0.25	3.25	1.3	H2-3953-40
*250–4200	3	5	*	0.2	1.2	—
*250–4200	3	40	*	0.2	1.2	—
*250–4200	40	5	*	3.25	1.3	—
*250–4200	40	25	*	3.25	1.3	—

*Models available in limited frequency bandwidths—Contact ARRA

DC VARIABLE ATTENUATORS



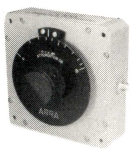
Freq. Rge. (MHz)	Atten. Rge. (dB)	Atten. vs Freq. (dB)	VSWR (Max.)	Ins. Loss (Max. dB)	Model No.
DC-60	40	±1.0	1.5	0.5	0682-40F
DC-100	15	±0.3	1.3	0.5	0682-15F
DC-100	30	±0.5	1.5	0.5	0682-30F
DC-250	10	±0.5	1.5	1.0	0682-10F
DC-500	10	±0.25	1.4	1.2	0682-10G

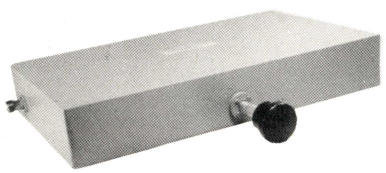
GENERAL SPECIFICATIONS

- Continuously Variable
- 1 Watt Average Power
- SMA Female Connectors
  (Type N, BNC, & TNC Available)

DC-60	40	±1.0	1.5	0.5	0682-40
DC-100	20	±0.6	1.3	0.5	0682-20
DC-100	30	±0.5	1.5	0.5	0682-30
DC-200	30	±2.0	1.5	1.0	0682-30A
DC-250	15	±1.2	1.5	1.0	0682-15
DC-500	10	±0.25	1.4	1.2	0682-10

HIGH POWER 500W CW 10KW PEAK





Freq. Range (GHz)	Power (Avg. W)	Min. Atten. Range (dB)	Atten. vs Freq. (±dB)	Model No.
0.5–1.0	50	10		2487-10
	500	10		2417-10X
.925–1.225	50	15	0.5	2-3617-15A
	50	30		2-3487-30A
1.0–2.0	50	10	1.0	3617-10F
	50	20		3617-20
	500	20		3417-10X
	50	30		3487-30
2.0–4.0	50	10	0.75	4617-10X
	50	20		4617-20X
	500	20		4417-20X
	50	40		4487-40
4.0–7.0	100	10	1.0	5417-10
4.0–8.0	500	20		5417-10X
7.0–11.0	100	10	1.0	6417-10
8.0–12.0	500	20		6417-20X

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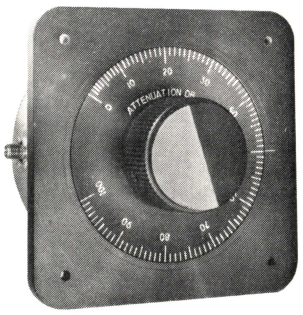
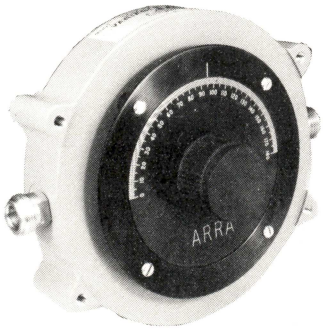
ARRA INC.
ANTENNA & RADOME RESEARCH ASSOCIATES

CONTINUOUSLY VARIABLE ATTENUATORS

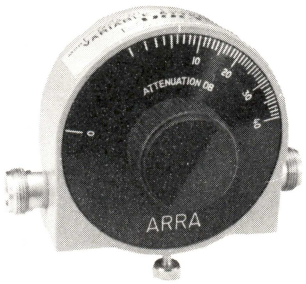
Vamp Type to 120 dB



Form 0-1212 (4" dia.)
Conn. Side & Rear



Form 0-19 (5" dia.)



Form 0-39 (3" dia.)

Form 0-51 (5" dia.)

GENERAL DESCRIPTION

This series of variable attenuators is our most popular type for direct reading requirements. As in most of our units, it features a non-contacting method of varying attenuation, and calibration does not change with usage. The direct reading models are furnished with an individually calibrated dial in 1 dB attenuation increments, while the level set units are supplied with a dial in degrees. Level set models may be directly calibrated at an additional charge. Most units of this type are manufactured to specific customer requirements. Accuracies can be quoted for your exact frequency band.

Forms 0—1014, 0—1028, 0—1029, and 0—1030 are for bench or panel mounting applications. The other forms have slightly modified versions which are specifically designed for panel mounting.

When panel mounting these units, turn the shaft fully clockwise (0 dial position), and after removing the dial in the dial holder, mount the unit behind the panel with the shaft protruding thru. Then set screw the dial hub to the shaft. The dial can be slipped to align the 0 with the index line (a separate index plate is furnished) and calibration accuracy is perfectly maintained. Because of this arrangement, the units can be oriented in any position behind the panel, while the index plate can be mounted to the panel anywhere on the periphery of the dial.

DIRECT READING MODELS

Freq. Rge. (GHz)	Min. Dynamic Atten. Rge. (dB)	Atten. vs Freq. (dB)	Form Factor	**Model No.
.5-1.0	60	1.0	0-214	2952-60
.5-1.0	80	1.25	0-214	2952-80
.5-1.0	100	1.50	0-214	2952-100
.9-1.3	60	0.5	0-660	2-3952-60
.9-1.3	80	0.5	0-660	2-3952-80
.96-1.215	90	0.5	0-1212	2-3954-90
.96-1.215	100	0.75	0-1212	2-3954-100
.9-1.3	100	0.75	0-660	2-3952-100
1.0-2.0	60	1.0	0-660	3952-60X
1.0-2.0	80	1.25	0-660	3952-80X
1.0-2.0	100	1.50	0-660	3952-100X
1.4-2.4	60	1.0	0-660	3-4952-60
1.4-2.4	80	1.25	0-660	3-4952-80
1.4-2.4	100	1.50	0-660	3-4952-100
2.0-4.0	60	1.0	0-660	4952-60X
2.0-4.0	80	1.25	0-660	4952-80X
2.0-4.0	100	1.50	0-660	4952-100X
4.0-8.0	60	1.25	5" Dia.	5952-60Y
4.0-8.0	80	1.50	5" Dia.	5952-80Y
***4.0-8.0	100	1.50	0-660	5952-100X

If any of the level set units (opposite page) are required to cover only a 10% frequency bandwidth, deduct 10% from the price.

*Frequency Range: 4.5-7.0 GHz.

**Model Numbers indicate Type N Connectors. All units are available with SMA Connectors at no additional charge. Add "S" to Model Number (i.e. 3114—10S or 6684—20FS) to specify SMA Connectors.

***Available only over less than octave band—consult factory.

Freq. Rge. (GHz)	Atten. Rge. (dB)	Atten. vs Freq. (dB)	Form Factor	**Model No.
0.96—1.215	15	±0.5	0—1014	3617—15F
1.0 —2.0	10	±1.0	0—1014	3617—10F
1.6 —1.66	60	±1.0	0—19	F3614—60
1.7 —1.9	40	±1.0	0—19	F3614—40
2.0 —4.0	10	±0.5	0—1014	4617—10F
	10	±1.25	0—39	4684—10F
	20	±1.5	0—51	4674—20F
	30	±2.0	0—51	4674—30F
2.2 —2.3	20	±0.3	0—51	F4674—20
	20	±0.5	0—39	F4684—20
	50	±1.0	0—51	F4674—50
2.5 —4.0	10	±0.75	0—51	4674—10G
	20	±1.0	0—51	4674—20G
2.9 —3.1	30	±0.5	0—51	F4674—30
	50	±1.5	0—39	F4684—50
3.0 —3.5	20	±0.5	0—39	G4684—20
3.0 —3.7	40	±1.0	0—51	F4674—40
3.2 —3.8	30	±1.0	0—51	G4674—30
3.4 —4.2	40	±1.5	0—51	G4674—40
3.7 —4.2	50	±2.0	0—39	G4684—50
4.0 —8.0	10	±0.6	0—39	5684—10F
	20	±1.0	0—39	5684—20F
4.2 —4.4	40	±0.75	0—39	F5684—40
4.4 —4.8	120	±1.5	0—1029	F5674—120
5.4 —11.0	10	±1.0	0—39—2	5—6684—10F
	20	±1.5	0—39—2	5—6684—20F
5.9 —6.4	30	±1.0	0—39	F5684—30
7.0 —11.0	10	±0.5	0—39—2	6684—10F
	20	±1.0	0—39—2	6684—20F
7.1 —8.4	40	±1.0	0—39—2	F6684—40
7.9— 8.4	30	±0.5	0—39—2	F6684—30
	50	±1.0	0—39—2	F6684—50
8.0 —10.0	30	±1.0	0—39—2	G6684—30
8.0 —12.4	10	±0.5	0—39—2	6684—10X
	20	±1.0	0—39—2	6684—20X
8.2 —8.4	60	±1.0	0—39—2	F6684—60
9.0 —10.0	50	±1.0	0—39—2	G6684—50
12.4 —18.0	10	±0.5	0—39—2	9684—10F
	30	±1.0	0—39—2	9684—30F

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ARRA INC.
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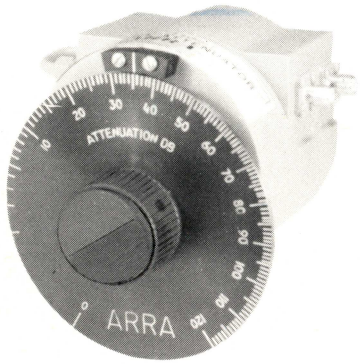
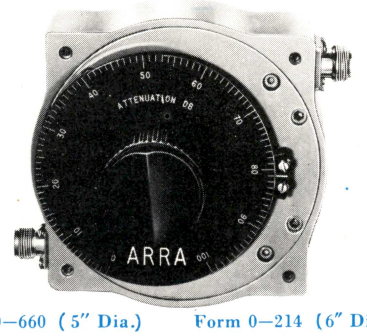
CONTINUOUSLY VARIABLE ATTENUATORS

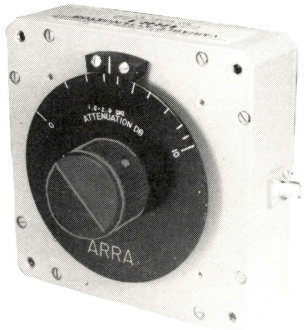
Vamp Type to 120 dB



Form 0—1028 (3" Dia.)



Form 0—660 (5" Dia.)



Form 0—214 (6" Dia.)

Form 0—1014 (4" Sq.)

GENERAL CHARACTERISTICS

- Frequency bands from 500—18000 MHz
- Continuously variable for all values of attenuation
- Many models exhibit flat attenuation vs frequency characteristics
- Zero backlash
- 10 W average power, 5 kw peak
- Type N or SMA female connectors are standard
- Low VSWR (1.50 max.)
- Non-contacting
- Low insertion loss
  0.5 dB max. for ≤ 60 dB models
  1.0 dB max. for > 60 dB models
  6.0 dB max. for Forms 0—660 & 0—214
- Directly calibrated or degree dial
- Meets applicable MIL specs
- Counter clockwise rotation increases loss
- Stop at low and high loss positions
- Material: { Body—Aluminum / Connectors—Stainless Steel }
- Finish: ARRA Blue per MIL—F—14072

LEVEL SET MODELS — CALIBRATED DIAL OPTIONAL

Freq. Rge. (GHz)	Atten. Rge. (dB)	Form Factor	**Model No.
.50-1.0	10	0-19	2614-10
1.0-2.0	10	0-19	3614-10
	20	0-19	3614-20
	30	0-19	3614-30
	40	0-19	3614-40
	55 > 1.3 GHz	0-19	3614-55
	45 ≤ 1.3 GHz		
	70	0-1030	3614-70
	80	0-1030	3614-80
	90	0-1030	3614-90
	100	0-1030	3614-100
2.0-4.0	10	0-39	4684-10
	10	0-51	4674-10
	20	0-39	4684-20
	20	0-51	4674-20
	30	0-51	4674-30
	40	0-51	4674-40
	50	0-51	4674-50
	60	0-51	4674-60
	70	0-1029	4674-70
	80	0-1029	4674-80
	90	0-1029	4674-90
	100	0-1029	4674-100
	110	0-1029	4674-110
	120	0-1029	4674-120
3.0-4.0	10	0-39	4684-10X
	20	0-39	4684-20X
	30	0-39	4684-30X
	40	0-39	4684-40X
	50	0-39	4684-50X
4.0-7.0	10	0-39	5684-10
	20	0-39	5684-20
	30	0-39	5684-30
	40	0-39	5684-40

Freq. Rge. (GHz)	Atten. Rge. (dB)	Form Factor	**Model No.
4.0-7.0	50	0-39	5684-50
	60	0-39	*5684-60
	70	0-1028	5684-70
	80	0-1028	5684-80
	90	0-1028	5684-90
	100	0-1028	5684-100
	110	0-1028	5684-110
	120	0-1028	*5684-120
5.4-11.0	10	0-39-2	5-6684-10
	20	0-39-2	5-6684-20
	30	0-39-2	5-6684-30
	40	0-39-2	5-6684-40
	50	0-39-2	5-6684-50
	60	0-39-2	5-6684-60
7.0-12.4	10	0-39-2	6684-10
	20	0-39-2	6684-20
	30	0-39-2	6684-30
	40	0-39-2	6684-40
	50	0-39-2	6684-50
	60	0-1028	6684-60
	70	0-1028	6684-70
	80	0-1028	6684-80
	90	0-1028	6684-90
	100	0-1028	6684-100
12.4-18.0	10	0-39-2	9684-10
	20	0-39-2	9684-20
	30	0-39-2	9684-30
	40	0-39-2	9684-40
	50	0-39-2	9684-50
	60	0-39-2	9684-60
	70	0-1028	9684-70
	80	0-1028	9684-80
	90	0-1028	9684-90
	100	0-1028	9684-100

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ARRA INC.
ANTENNA & RADOME RESEARCH ASSOCIATES

TERMINATIONS & COAXIAL ATTENUATORS

Fixed & Remotely Operated

DC-18GHz TERMINATIONS & D.C. BLOCKS

Item	Frequency Range (GHz)	Connector Type	Model No.
1 W. Termination	DC-18.0	SMA Male	9512
2 W. Termination	DC-12.4	N Male	N9512
10 W. Termination	DC-12.4	N Male	N9510
25 W. Termination	DC-8.0	SMA Male	9525
50 W. Termination	DC-8.0	N Male	N9550
Outside Block	0.1-18.0	SMA M/F	1-9572
Inside Block	0.1-3.0	SMA M/F	1-4572D
Inside Block	3.0-12.4	SMA M/F	4-6572D
Inside/Outside Block	0.1-3.0	SMA M/F	1-4572E
Inside/Outside Block	3.0-12.4	SMA M/F	4-6572E

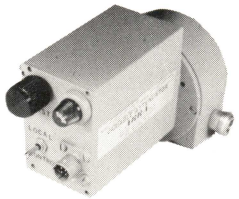
MINIATURE DC-18GHz FIXED ATTENUATORS

Average Power to 50 Watts

Attenuation Values to 55 dB (3, 6, 10, 20 dB stock)

Frequency Range (GHz)	Power (Avge. W.)	Connector Type	Model No.
DC-18.0	1	SMA M/F	9412-**
DC-18.0	2	N M/F	N9412-**
DC-5.0	1	SMA M/F	4401-**
DC-5.0	2	N M/F	N4401-**
DC-4.0	10	SMA M/F	4410-**
DC-4.0	10	N M/F	N4410-**
DC-4.0	25	SMA M/F	4425-**
DC-4.0	25	N M/F	N4425-**
DC-4.0	50	SMA M/F	4450-**
DC-4.0	50	N M/F	N4450-**

**Value of attenuation



MODEL NUMBER CODE

Basic Attenuator Model—XX—X

Voltage	Optional Features
28, 24, 15, 12, AC (Indicates either AC operation or appropriate DC voltage)	1 — No optional feature 2 — Includes follower pot option 3 — Includes local override option 4 — Includes option codes 2 and 3

MOTORIZED AC & DC

Motor Head Characteristics

D.C. Voltage 28V, 24V, 15V, 12V

A.C. Voltage ..... 115V, 60 Hz

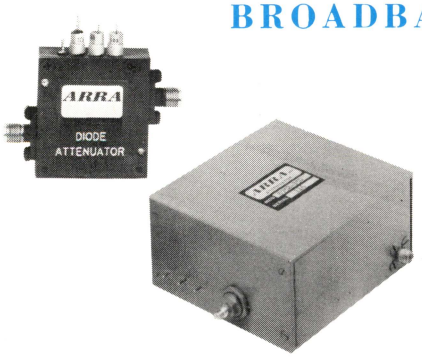
Actuating Current ... 200 ma max. (D.C. versions)
250 ma max. (A.C. version)

Speed ..... 1½ RPM
(other values available)

Attenuator Characteristics

The RF specifications of this package are identical to those indicated for the specific variable attenuator model selected. Units consist of an integrated motor head and single turn variable attenuator. Any of the single turn models shown on the preceding pages may be utilized in this package. Units are available with an optional follower potentiometer output and a local override switch.

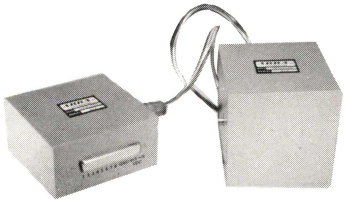
BROADBAND REMOTELY CONTROLLED



Voltage (Continuously) Variable

Linear Control

Model No.	Freq. Rge. (GHz)	Min. Atten. Range (dB)	Atten. vs Freq. (dB)
8752-35D	0.2-18.0	35 (0.2-8.0 GHz) 35 (8.0-12.4 GHz) 30 (12.4-18.0 GHz)	±1.0
8752-65D	0.2-18.0	65 (0.2-8.0 GHz) 65 (8.0-12.4 GHz) 60 (12.4-18.0 GHz)	±1.5 ±1.5 ±2.0
4752-60D	2.0-4.0	60	±1.6
5752-60D	4.0-8.0	60	±1.6
6-9752-60D	8.0-18.0	60	±1.6



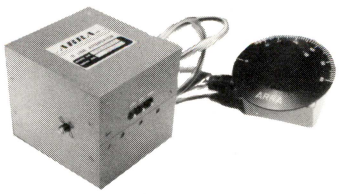
Computer (Step) Programmable

TTL compatible (Binary, BCD, or Decimal)

±0.1 dB Resettability
75 μsec Switching Speed
SMA Female RF Conn.
±15 volts D.C. Voltage
(±125 ma for ≤30 dB)
(±250 ma for >30 dB)

Typical Models

Freq. Rge. (GHz)	Atten. Rge. (dB)	Steps (dB)
0.2-12.0	10	1
	30	1
	30	5
0.2-8.0	60	1
	60	10
8.0-12.0	60	1
	60	10
8.0-18.0	10	1
	30	1
	30	5
12.0-18.0	10	1
	30	1
	30	5
	60	1
	60	10



Direct Reading

Manual Control

These multi-octave units are ideal for applications requiring remote manual (direct reading) control of attenuation in systems covering large portions of the frequency spectrum.

Model No.	Freq. Rge. (GHz)	Min. Atten. Rge. (dB)	Max. Ins. Loss (dB)	Atten. vs. Freq. (dB)
8752-30MDR	0.2-8.0	30	1.5	±1.0
	8.0-12.4	30	1.8	
	12.4-18.0	30	2.5	
8752-60MDR	0.2-8.0	60	2.5	±1.5
	8.0-12.4	60	3.0	±1.5
	12.4-18.0	60	5.0	±2.0

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ARRA INC.
ANTENNA & RADOME RESEARCH ASSOCIATES

COAXIAL COMPONENTS

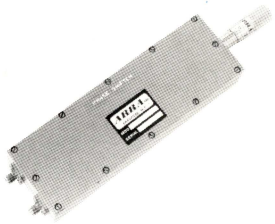
PHASE SHIFTERS

OCTAVE BAND

Freq. Range (GHz)	Min. Phase Adjustment	*Max. Insertion Loss (Db)	Max. VSWR	**Model No.
1.0-2.0	90°	1.0	2.0	3418-90
2.0-4.0	90°	1.0	1.5	4418-90
	180°	2.0	1.75	4418-180
4.0-8.0	90°	1.0	1.5	5418-90
	180°	2.0	2.0	5418-180
7.0-11.0	90°	1.0	1.5	6428-90
	180°	2.0	2.0	6428-180
8.0-12.4	90°	1.0	1.5	6428-90X
	180°	2.0	2.0	6428-180X
8.0-16.0	360°	3.0	2.0	9428-360A
9.0-11.0	45° at 9 GHz 90° at 10 GHz	1.0	1.5	6428-45X

*Max. value for any phase setting.
**Models 6428-45X & 9428-360A have SMA connectors. Other model numbers indicate Type N connectors. Add "S" to model number to specify SMA connectors. No additional charge.

BROADBAND DC-18GHz



GENERAL SPECIFICATIONS

Freq. Rge. DC-18GHz
Max. VSWR ..... 1.3 to 4GHz
1.5 to 12GHz
1.6 to 18GHz
Ins. Loss ..... 0.5 to 12GHz
(Max. dB) 1.0 to 18GHz
RF Power ..... 100 W Average
5 KW Peak

Freq. Rge. (GHz)	Min. Phase Adjustment	Size (Excl. Conn.) L	W	H	Model No.
DC-18	60°/GHz (360° Min at 6GHz)	5.5	2.0	.75	9428A
DC-18	30°/GHz (180° Min at 6GHz)	3.75	2.0	.75	9428B

POWER DIVIDERS/COMBINERS

2-Way Models

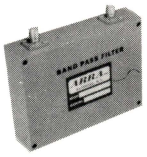
Frequency Range (GHz)	Isolation Min. (dB)	VSWR (Max.)	Ins. Loss (Max. dB)	Amplitude Bal. (±db)	Phase Bal. (±Deg.)	Model No.
0.25-0.50	20	1.20	0.3	0.20	1	1200-2
0.50-1.0	20	1.20	0.3	0.20	2	2200-2
1.0 -2.0	20	1.20	0.3	0.20	3	3200-2
1.0 -8.0	15	1.75	1.0	0.20	5	3-5200-2
2.0 -4.0	20	1.30	0.3	0.20	3	4200-2
2.0 -10.0	15	1.75	1.0	0.25	5	4-6200-2
4.0 -8.0	18	1.60	0.6	0.20	3	5200-2
8.0 -12.4	16	1.60	0.6	0.20	4	6200-2
12.0-18.0	14	1.80	0.8	0.25	5	9200-2

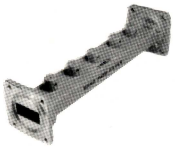
4-Way Models

0.5 -1.0	20	1.30	0.5	0.30	3.0	2200-4
1.0 -2.0	20	1.35	0.5	0.30	3.0	3200-4
2.0 -4.0	20	1.35	0.5	0.30	3.0	4200-4
4.0 -8.0	16	1.70	0.9	0.30	4.0	5200-4
8.0 -12.4	16	1.70	0.9	0.40	6.0	6200-4
12.0-18.0	14	1.90	1.8	0.40	10.0	9200-4

MICROWAVE FILTERS

STRIPLINE • WAVEGUIDE • COAX





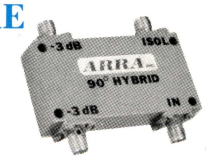
- 30-18000 MHz (Narrow & Octave)
- High Power
- Miniature Size
- Band Pass
- Band Reject
- Low Pass
- 90 dB Rejection

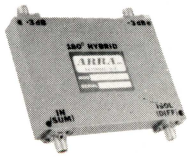
MINIATURE DIRECTIONAL COUPLERS

Freq. Range (GHz)	Direc-tivity (Min. Db)	Max. VSWR Prim.	Max. VSWR Sec.	Ins. Loss (Max. dB)	Model No.
0.5-1.0	20	1.15	1.15	0.2	2164-**
0.7-1.4	20	1.15	1.15	0.2	2-3164-**
1.0-2.0	20	1.15	1.10	0.2	3164-**
2.0-4.2	20	1.15	1.20	0.2	4164-**
4.0-8.0	17	1.25	1.30	0.4	5164-**
7.0-12.4	15	1.40	1.40	0.4	6164-**
8.0-16.0	15	1.45	1.45	0.5	6-9164-**
12.0-18.0	15	1.45	1.45	0.4	9164-**

*±1.0 dB max. Coupling variation (includes deviation from nominal and frequency sensitivity).
**Value of coupling.

90° & 180° HYBRIDS





90° HYBRIDS

Frequency Range (GHz)	Isolation Min. (dB)	VSWR (Max.)	Ins. Loss Max. (dB)	Ampli-tude Bal. (±dB)	Model No.
0.5 - 1.0	25	1.25	0.25	0.50	2164-90
0.925 - 1.225	25	1.25	0.25	0.50	2-3164-90
1.0 - 2.0	25	1.25	0.25	0.50	3164-90
2.0 - 4.2	20	1.25	0.25	0.50	4164-90
4.0 - 8.0	18	1.30	0.30	0.50	5164-90
7.0 - 12.4	16	1.35	0.50	0.50	6164-90
8.0 - 16.0	15	1.45	0.60	0.50	6-9164-90
12.4 - 18.0	15	1.50	0.60	0.50	9164-90

180° HYBRIDS

Freq. Range (GHz)	Isolation Min. (dB)	VSWR (Max.)	Ins. Loss Max. (dB)	Ampli-tude Bal. (±dB)	Phase Bal. (±Deg.)	Model No.
0.5 - 1.0	20	1.30	0.4	0.50	6	2164-180
0.7 - 1.4	20	1.35	0.4	0.50	6	2-3164-180
1.0 - 2.0	20	1.35	0.5	0.50	6	3164-180
2.0 - 4.2	18	1.50	0.6	0.50	6	4164-180
4.0 - 8.0	15	1.60	0.7	0.50	8	5164-180
7.0 - 11.0	15	1.70	0.9	0.50	8	6164-180A
8.0 - 12.4	14	1.90	1.0	0.50	9	6164-180

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ARRA INC.
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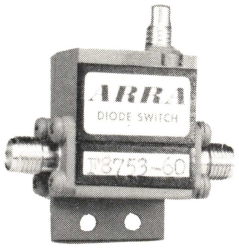
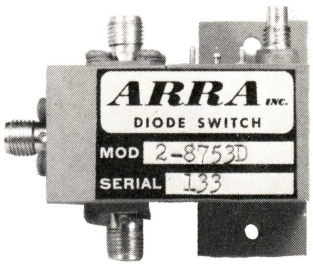
DIODE SWITCHES

100—18000 MHz
Single Unit

BROADBAND COAXIAL MODELS





GENERAL SPECIFICATIONS

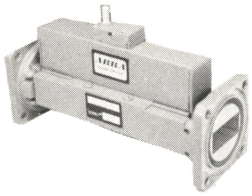
- Frequency Range
  - F8753 Types ..... 100-18000 MHz
  - H8753 Types ..... 500-18000 MHz
  - 8753 Types ..... 200-18000 MHz
  - Multi-Throw Types ..... 200-18000 MHz
- TTL Compatibility
- Switching Time
  - F8753 Types ..... 20 nsec
  - H8753 Types ..... 10 nsec
  - 8753 Types ..... 50 nsec
  - Multi-Throw Types ... 500 nsec
- Connectors (R.F.)..... SMA Female
- R.F. Power
  - F8753 Types ..... 2 W Average, 10 W Peak
  - H8753 Types ..... 2 W Average, 10 W Peak
  - 8753 Types ..... 5 W Average, 75 W Peak
  - Multi-Throw Types . 2 W Average, 75 W Peak

  (Bias or Gate)..... SMC Male

SPST & MULTI-THROW MODELS

Configuration	Isolation/ Insertion Loss	Frequency Range (GHz)						Model No.	
		<1.0	1.0-2.0	2.0-4.0	4.0-8.0	8.0-12.4	12.4-18.0	With Driver	Without Driver
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	33 1.0	40 1.0	45 1.0	45 1.3	45 2.0	45 2.3	F8753—40D	F8753—40
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	33 1.0	40 1.0	45 1.0	45 1.3	45 2.0	45 2.3	H8753—40D	H8753—40
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	28 1.0	30 1.0	38 1.0	45 1.3	45 1.6	45 2.0	8753—40D	8753—40
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	40 1.0	60 1.0	70 1.2	70 1.6	70 2.4	70 3.0	F8753—60D	F8753—60
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	40 1.0	60 1.0	70 1.2	70 1.6	70 2.4	70 3.0	H8753—60D	H8753—60
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	34 1.0	40 1.0	50 1.2	63 1.6	63 2.0	63 2.3	8753—60D	8753—60
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	45 1.2	70 1.2	85 1.3	85 2.0	85 2.7	80 3.3	F8753—80D	F8753—80
SPST	Isolation (Min. dB) Insertion Loss (Max dB)	45 1.2	70 1.2	85 1.3	85 2.0	85 2.7	80 3.3	H8753—80D	H8753—80
SPST	Isolation (Min, dB) Insertion Loss (Max dB)	38 1.2	50 1.2	65 1.3	80 1.9	80 2.3	78 2.6	8753—80D	8753—80
SPDT	Isolation (Min. dB) Insertion Loss (Max dB)	55 1.5	55 1.5	55 1.5	55 1.75	50 1.75	45 2.2	2—8753D	2—8753
SP3T	Isolation (Min. dB) Insertion Loss (Max dB)	55 1.5	55 1.5	55 1.5	55 1.75	50 1.75	45 2.5	3—8753D	3—8753
SP4T	Isolation (Min. dB) Insertion Loss (Max dB)	55 1.5	55 1.5	55 1.5	55 1.75	50 2.0	45 2.5	4—8753D	4—8753
SP5T	Isolation (Min. dB) Insertion Loss (Max dB)	55 1.5	55 1.5	55 1.5	55 1.75	50 2.0	45 3.0	5—8753D	5—8753

BROADBAND WAVEGUIDE MODELS



GENERAL SPECIFICATIONS

RF Power (at +30°C) ..... 2 watts aver., 10 w peak
Switching Speed ..... 10 nsec
Bias Requirements:
Without Driver ..... "on"—10 volts
"off" +35 ma (—1 models)
+70 ma (—3 models)
With Driver ..... "Trigger": TTL Compatible

"DC Voltage":	+15V	—15V
(—1 models)	55 ma	20 ma
(—3 models)	90 ma	20 ma

FAST SWITCHING

Freq. Rge. (GHz)	W—G Size	Min. Isolation (dB)	Max. Ins. Loss (dB)	Model Number	
				With Driver	Without Driver
2.60—3.95	WR284	45	1.5	S115-1D	S115-1
		85	1.75	S115-3D	S115-3
3.95—5.85	WR187	45	1.75	SC115-1D	SC115-1
		85	2.5	SC115-3D	SC115-3
5.80—8.20	WR137	45	1.75	C115-1D	C115-1
		85	2.5	C115-3D	C115-3
7.05—10.0	WR112	45	2.5	XL115-1D	XL115-1
		85	3.25	XL115-3D	XL115-3
8.2 —12.4	WR90	45	2.5	X115-1D	X115-1
		85	3.25	X115-3D	X115-3
12.4 —18.0	WR62	45	3.0	KU115-1D	KU115-1
		80	4.0	KU115-3D	KU115-3

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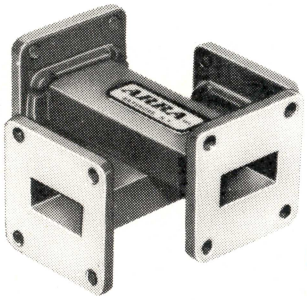
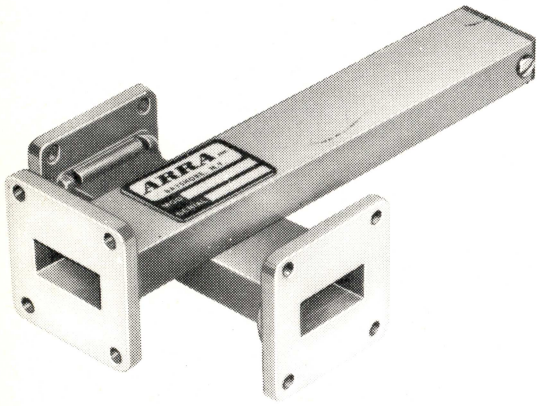
WAVEGUIDE CROSS GUIDE COUPLERS

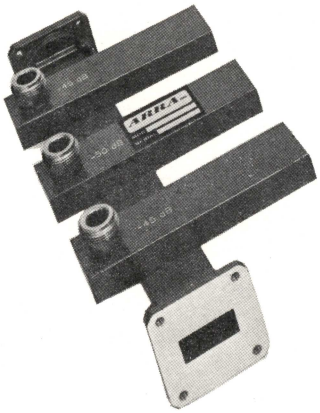


Model 90-600-30

Model 137-602-20



Model 90-601-40



Special Design

GENERAL SPECIFICATIONS

Directivity (See Gen'l Info) . 15 dB min.
Frequency Sensitivity. . . . . ±1.3 dB max.
Coupling . . . . . 20, 30, 40 dB STD.
VSWR:
  600 & 601 Types. . . . . 1.15 max.
  602 Types . . . . . 1.25 max.
Flange Type. . . . . Cover
Coax Connector . . . . . SMA or Type N Female
Material:
  WG & Flange . . . . . Aluminum
  Coax Connector . . . . . Stainless Steel
Finish . . . . . ARRA Blue Per MIL-F-14072

GENERAL INFO/OPTIONS

ARRA offers three standard series of cross guide couplers; unterminated (600 Series), terminated (601 Series), terminated with coax coupled output (602 Series). Additionally, units are available with multiple coupled arms having both forward and reverse coupling of any value. All standard units are manufactured from aluminum material. Brass or O.F.H.C. is also available. Higher directivity models are available over limited frequency bands.

Freq. Range (GHz)	WG Size	*Model No.		
		600 Series	601 Series	602 Series
2.60-3.95	WR284	284-600-**	284-601-**	284-602-**
3.30-4.90	WR229	229-600-**	229-601-**	229-602-**
3.95-5.85	WR187	187-600-**	187-601-**	187-602-**
4.90-7.05	WR159	159-600-**	159-601-**	159-602-**
5.85-8.20	WR137	137-600-**	137-601-**	137-602-**
7.05-10.0	WR112	112-600-**	112-601-**	112-602-**
7.00-11.0	WR102	102-600-**	102-601-**	102-602-**
8.20-12.4	WR90	90-600-**	90-601-**	90-602-**
12.4-18.0	WR62	62-600-**	62-601-**	62-602-**

*Add "B" to Model No. to indicate brass material. Standard 602 Series has SMA coupled output. Add "N" to Model No. to indicate Type N connector.
**Value of coupling

ARRA INC.
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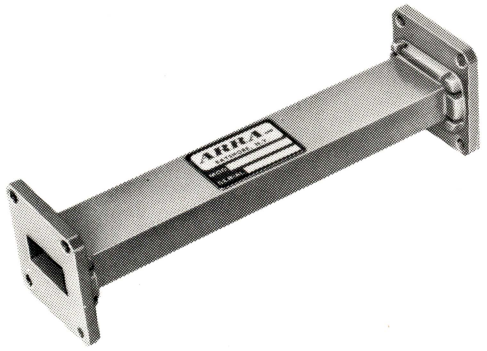
BULKHEAD FEEDTHRU TWISTS & STRAIGHT SECTIONS

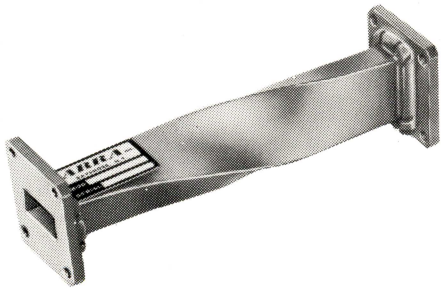
GENERAL SPECIFICATIONS

VSWR:
- 220 & 270 Types. . . . . 1.05 max.
- 440 Types . . . . . 1.10 max.

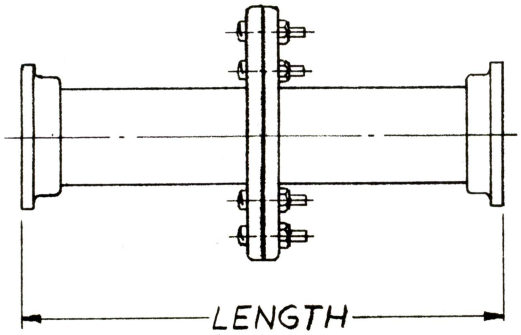
Material. . . . . Aluminum
Flanges . . . . . Cover/Cover
Finish . . . . . ARRA Blue per MIL-F-14072



Model 90-220-06



Model 90-440-06



Model 90-270-06

GENERAL INFO/OPTIONS

1. Add "B" to basic Model No. for brass material.
2. Length may be modified. Replace last two digits with required length.
3. Add -1 for cover/choke flange.
   Add -2 for choke/choke flange.

STRAIGHT SECTIONS

Freq. Rge. (GHz)	WG Size	Length (In)	Model No.
1.70-2.60	WR430	12	430-220-12
2.20-3.30	WR340	12	340-220-12
2.60-3.95	WR284	8	284-220-08
3.30-4.90	WR229	6	229-220-06
3.95-5.85	WR187	6	187-220-06
4.90-7.05	WR159	6	159-220-06
5.85-8.20	WR137	6	137-220-06
7.05-10.0	WR112	6	112-220-06
7.00-11.0	WR102	6	102-220-06
8.20-12.4	WR90	6	90-220-06
12.4-18.0	WR62	6	62-220-06
18.0-26.5	WR42	3	42-220-03
22.0-33.0	WR34	3	34-220-03
26.5-40.0	WR28	3	28-220-03

90° TWISTS

Freq. Rge. (GHz)	WG Size	Length (In)	Model No.
1.70-2.60	WR430	16	430-440-16
2.20-3.30	WR340	16	340-440-16
2.60-3.95	WR284	13	284-440-13
3.30-4.90	WR229	12	229-440-12
3.95-5.85	WR187	9	187-440-09
4.90-7.05	WR159	6	159-440-06
5.85-8.20	WR137	6	137-440-06
7.05-10.0	WR112	6	112-440-06
7.00-11.0	WR102	6	102-440-06
8.20-12.4	WR90	6	90-440-06
12.4-18.0	WR62	4	62-440-04
18.0-26.5	WR42	3	42-440-03
22.0-33.0	WR34	3	34-440-03
26.5-40.0	WR28	3	28-440-03

BULKHEAD FEEDTHRU

Freq. Rge. (GHz)	WG Size	Length (In)	Model No.
1.70-2.60	WR430	12	430-270-12
2.20-3.30	WR340	12	340-270-12
2.60-3.95	WR284	8	284-270-08
3.30-4.90	WR229	6	229-270-06
3.95-5.85	WR187	6	187-270-06
4.90-7.05	WR159	6	159-270-06
5.85-8.20	WR137	6	137-270-06
7.05-10.0	WR112	6	112-270-06
7.00-11.0	WR102	6	102-270-06
8.20-12.4	WR90	6	90-270-06
12.4-18.0	WR62	6	62-270-06
18.0-26.5	WR42	3	42-270-03
22.0-33.0	WR34	3	34-270-03
26.5-40.0	WR28	3	28-270-03

ARRA INC.
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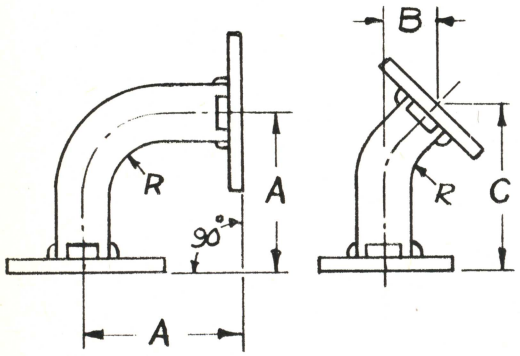
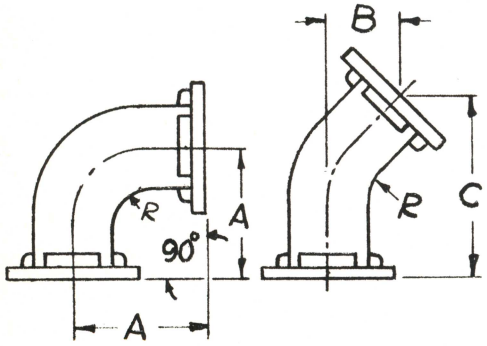
WAVEGUIDE BENDS

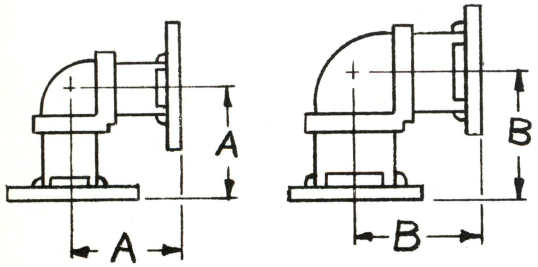
45° & 90°

GENERAL SPECIFICATIONS

VSWR . . . . . 1.05 max.
Material . . . . . Alumimum
Flanges . . . . . Cover/Cover
Finish . . . . . ARRA Blue per MIL-F-14072







GENERAL INFO/OPTIONS

1. Add "B" to basic Model No. for brass material.
2. Add -1 for cover/choke flange.
3. Add -2 for choke/choke flange.

45° and 90° E PLANE BENDS

Freq. Rge. (GHz)	WG Size	R	A	C	B	Model No.	
						45°	90°
1.70-2.60	430	6	12	8.54	3.54	430-401	430-400
2.20-3.30	340	6	10	7.68	3.18	340-401	340-400
2.60-3.95	284	3	6	5.75	2.38	284-401	284-400
3.30-4.90	229	3	4	4.27	1.77	229-401	229-400
3.95-5.85	187	2	3	4.52	1.87	187-401	187-400
4.90-7.05	159	2	2.5	3.41	1.41	159-401	159-400
5.85-8.20	137	1.5	2.5	3.84	1.59	137-401	137-400
7.05-10.0	112	1.0	2	2.56	1.06	112-401	112-400
7.00-11.0	102	1.0	2	2.30	.95	102-401	102-400
8.20-12.4	90	1	2.0	2.13	.88	90-401	90-400
10.0-15.0	75	1	1.75	2.13	.88	75-401	75-400
12.4-18.0	62	1	1.75	1.88	.78	62-401	62-400
18.0-26.5	42	0.5	1	1.519	.629	42-401	42-400
26.5-40.0	28	0.5	1	1.306	.541	28-401	28-400

45° and 90° H PLANE BENDS

1.70-2.60	430	6	12	9.39	3.89	430-421	430-420
2.20-3.30	340	6	10	8.19	3.39	340-421	340-420
2.60-3.95	284	3	6	5.75	2.38	284-421	284-420
3.30-4.90	229	3	4	4.44	1.84	229-421	229-420
3.95-5.85	187	2	3	4.52	1.87	187-421	187-420
4.90-7.05	159	2	2.5	3.58	1.48	159-421	159-420
5.85-8.20	137	1.5	2.5	4.18	1.73	137-421	137-420
7.05-10.0	112	1.0	2	2.73	1.13	112-421	112-420
7.00-11.0	102	1.0	2	2.48	1.03	102-421	102-420
8.20-12.4	90	1	2.0	2.30	.95	90-421	90-420
10.0-15.0	75	1	1.75	2.30	.95	75-421	75-420
12.4-18.0	62	1	1.75	2.05	.85	62-421	62-420
18.0-26.5	42	0.5	1	1.690	.700	42-421	42-420
26.5-40.0	28	0.5	1	1.477	.612	28-421	28-420

90° E and H PLANE MITER BENDS

Freq. Rge. (GHz)	WG Size	A	B	Model No.	
				E Plane	H Plane
2.60-3.95	284	2.12	3.75	284-410	284-430
3.30-4.90	229	1.59	2.21	229-410	229-430
3.95-5.85	187	1.34	1.87	187-410	187-430
4.90-7.05	159	1.16	1.75	159-410	159-430
5.85-8.20	137	1.44	1.82	137-410	137-430
7.05-10.0	112	1.28	1.60	112-410	112-430
7.00-11.0	102	1.22	1.47	102-410	102-430
8.20-12.4	90	1.22	1.34	90-410	90-430
10.0-15.0	75	1.03	1.16	75-410	75-430
12.4-18.0	62	.85	.88	62-410	62-430
18.0-26.5	42	.64	.77	42-410	42-430
26.5-40.0	28	.53	.77	28-410	28-430

ARRA INC.
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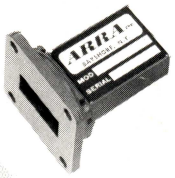
WAVEGUIDE COMPONENTS & ASSEMBLIES

ARRA will fabricate your special waveguide assemblies in any material, finish, and in most waveguide sizes.

Items range from the simplest straight section and single bend to complex combinations of bends, miters, twists, etc.

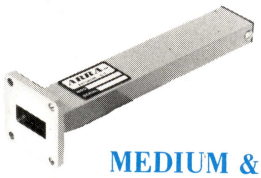
Stringent quality controls and electrical test facilities enable ARRA to guarantee your mechanical and electrical specifications.

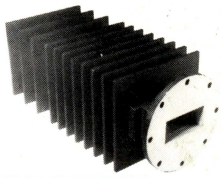


DUMMY LOADS

LOW POWER 1.01 VSWR

Freq. Range (GHz)	WG Size	VSWR (Max.)	Power (Avge. W)	Length (Max. In.)	Model No.
2.60-3.95	WR284	1.02	10	8.00	284-928A
2.60-3.95	WR284	1.01	10	10.00	284-928
3.30-4.90	WR229	1.01	10	7.00	229-928
3.95-5.85	WR187	1.01	8	6.00	187-928
4.90-7.05	WR159	1.01	7	5.50	159-928
5.85-8.20	WR137	1.01	6	5.00	137-928
5.85-8.20	WR137	1.02	6	3.75	137-928A
7.05-10.0	WR112	1.01	4	4.50	112-928
7.00-11.0	WR102	1.01	3	3.25	102-928
8.20-12.4	WR90	1.01	4	3.50	90-928
8.20-12.4	WR90	1.04	0.5	1.25	90-928A
12.4-18.0	WR62	1.01	1.5	3.25	62-928

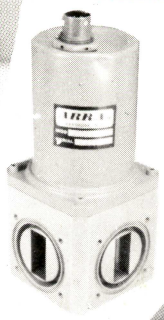


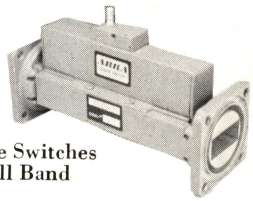


MEDIUM & HIGH POWER

Freq. Range (GHz)	WG Size	Medium Power		High Power	
		Avge. (W)	Model No.	Avge. (W)	Model No.
2.60-3.95	WR284	1200	284-925	4500	284-920
3.30-4.90	WR229	1000	229-925	3000	229-920
3.95-5.85	WR187	750	187-925	2000	187-920
4.90-7.05	WR159	625	159-925	1500	159-920
5.85-8.20	WR137	500	137-925	1000	137-920
7.05-10.0	WR112	425	112-925	600	112-920
7.00-11.0	WR102	325	102-925	500	102-920
8.20-12.4	WR90	225	90-925	500	90-920
12.4-18.0	WR62	200	62-925	250	62-920

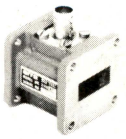
Mechanical Switches Solenoid



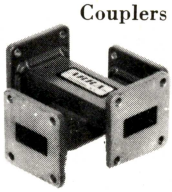


Diode Switches Full Band

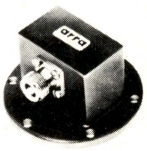
Diode Switches Miniature



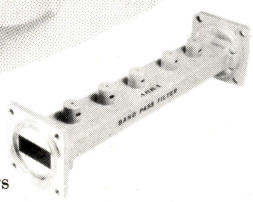
Couplers



Variable Attenuators

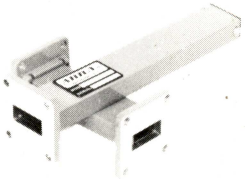


Adapters

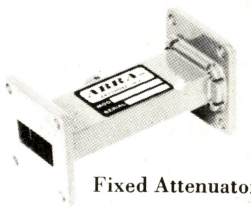


Band Pass & Band Reject Filters

Mechanical Switches Manual



Couplers Terminated



Fixed Attenuators

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